CLAIMS

1. An apparatus for processing a microelectronic substrate, comprising:

a polishing pad having a planarizing surface;

a source of planarizing liquid in fluid communication with the planarizing surface of the polishing pad; and

a source of rinsing liquid in fluid communication with the planarizing surface of the polishing pad, the source of rinsing liquid having a rinsing liquid with a chemical composition different than a chemical composition of the planarizing liquid and a pH approximately the same as a pH of the planarizing liquid.

2. The apparatus of claim 1 wherein the source of rinsing liquid includes a first source having a first rinsing substance, a second source having a second rinsing substance, and a flow valve in fluid communication with the first and second sources, the flow valve being adjustable to control the pH of the rinsing liquid.

3. The apparatus of claim 2 wherein the first rinsing substance includes deionized water and the second rinsing substance includes tetramethyl ammonium hydroxide.

4. The apparatus of claim 3 wherein the rinsing liquid includes tetramethyl ammonium hydroxide and deionized water and a volumetric ratio of the tetramethyl ammonium hydroxide to the deionized water is approximately 0.006%.

5. The apparatus of claim 1, further comprising the planarizing liquid.

6. The apparatus of claim 5 wherein the planarizing liquid includes abrasive particles.

7. The apparatus of claim 1, further comprising a pH meter in fluid communication with at least one of the rinsing liquid and the planarizing liquid to detect the pH of the at least one liquid.

8. The apparatus of claim 7 wherein the pH meter includes a conductivity meter.

9. The apparatus of claim 1, further comprising a passageway in fluid communication with the source of planarizing liquid and the source of rinsing liquid, the passageway having an aperture positioned at least proximate to the planarizing surface of the polishing pad to supply the planarizing liquid and the rinsing liquid to the planarizing surface of the polishing pad.

10. The apparatus of claim 9 wherein the polishing pad has a lower surface opposite the planarizing surface and the passageway extends through the polishing pad from the lower surface of the polishing pad to the planarizing surface of the polishing pad.

11. The apparatus of claim 9 wherein the passageway has a valve between the planarizing surface, the source of planarizing liquid, and the source of rinsing liquid, the valve being adjustable to regulate a flow of at least one of the planarizing liquid and the rinsing liquid to the planarizing surface.

12. The apparatus of claim 1, further comprising a rinsing chamber proximate to the polishing pad, the rinsing chamber having a rinsing liquid aperture in fluid communication with the source of rinsing liquid, the rinsing liquid aperture being directed toward the microelectronic substrate to rinse the microelectronic substrate when the microelectronic substrate is positioned in the rinsing chamber.

13. The apparatus of claim 12, further comprising a rinsing chamber passageway connected between the rinsing liquid aperture and the source of rinsing liquid to transport the rinsing liquid from the source of rinsing liquid to the rinsing liquid aperture.

14. The apparatus of claim 13 wherein the rinsing chamber passageway includes a valve for regulating a flow of the rinsing liquid between the source of rinsing liquid and the rinsing liquid aperture.

15. The apparatus of claim 1 wherein the rinsing liquid has a pH in the range of approximately 10.6 to 11.4.

16. The method of claim 1 wherein the rinsing liquid has a pH of approximately 11.0.

17. The apparatus of claim 1 wherein the source of planarizing liquid is in fluid communication with the planarizing surface of the polishing pad at a different time than when the source of rinsing fluid is in fluid communication with the planarizing surface of the polishing pad.

18. A method for planarizing a microelectronic substrate with a planarizing machine having a planarizing medium that includes a non-abrasive polishing pad and an abrasive slurry, the method comprising:

moving one of the polishing pad and the microelectronic substrate relative to the other of the polishing pad and the microelectronic substrate to remove material from the microelectronic substrate; and

maintaining a pH of the microelectronic substrate at an approximately constant level by maintaining a pH of the abrasive slurry at an approximately constant level while reducing a relative velocity between the microelectronic substrate and the polishing pad to approximately zero.

19. The method of claim 18 wherein maintaining the pH of the microelectronic substrate includes reducing attractive forces between the microelectronic substrate and the material removed from the microelectronic substrate.

20. The method of claim 18 wherein the polishing pad has a planarizing surface adjacent the microelectronic substrate, further comprising passing the abrasive slurry upwardly through openings in the planarizing surface of the polishing pad.

21. The method of claim 18 wherein the polishing pad has a planarizing surface adjacent the microelectronic substrate, further comprising depositing the abrasive slurry downwardly onto the planarizing surface of the polishing pad.

22. The method of claim 18, further comprising selecting the abrasive slurry to include ammonia.

23. The method of claim 18, further comprising selecting the abrasive slurry to have a pH in the range of approximately 10.6 to approximately 11.4.

24. The method of claim 18, further comprising selecting the abrasive slurry to have a pH of approximately 11.0.

25. The method of claim 18 wherein maintaining the pH of the microelectronic substrate includes reducing the relative velocity between the microelectronic substrate and the polishing pad to approximately zero over a period of time in the range of approximately twenty seconds to approximately forty seconds.

26. The method of claim 18, further comprising removing polishing pad material from the polishing pad by contacting the polishing pad with a conditioning liquid having a pH approximately equal to a pH of the abrasive slurry.

27. The method of claim 26 wherein the polishing pad has a planarizing surface for removing material from the microelectronic substrate, further comprising buffing the microelectronic substrate on the planarizing surface by engaging the microelectronic substrate with the polishing pad after removing polishing pad material from the planarizing surface and moving at least one of the polishing pad and the microelectronic substrate relative to the other of the polishing pad and the microelectronic substrate.

28. The method of claim 18, further comprising moving the microelectronic substrate from the polishing pad to a rinsing location spaced apart from the polishing pad and rinsing the microelectronic substrate at the rinsing location with a rinsing fluid having a pH approximately equal to a pH of the abrasive slurry.

29. The method of claim 28 wherein rinsing the microelectronic substrate includes rinsing the microelectronic substrate for a period of approximately five seconds.

30. The method of claim 28, further comprising selecting the rinsing liquid to include deionized water and tetramethyl ammonium hydroxide.

31. The method of claim 30 wherein selecting the rinsing liquid includes selecting a volume of the tetramethyl ammonium hydroxide to be approximately 0.006% of a volume of the deionized water.

32. The method of claim 28, further comprising selecting the rinsing liquid to have a pH in the range of approximately 10.6 to approximately 11.4.

33. The method of claim 28, further comprising selecting the rinsing liquid to have a pH of approximately 11.0.

34. A method for planarizing a microelectronic substrate with a planarizing machine having a planarizing surface, the method comprising:

positioning the microelectronic substrate adjacent to the planarizing surface to engage the microelectronic substrate with the planarizing surface and moving one of the planarizing surface and the microelectronic substrate relative to the other of the planarizing surface and the microelectronic substrate to remove material from the microelectronic substrate;

supplying a first fluid to the planarizing surface; and

maintaining a pH of the microelectronic substrate at an approximately constant level while reducing a relative velocity between the microelectronic substrate and the planarizing surface by supplying to the planarizing surface a second fluid having a chemical composition different than a chemical composition of the first fluid and a pH approximately the same as a pH of the first fluid.

35. The method of claim 34, further comprising selecting the second fluid to have an electrical charge approximately the same as an electrical charge of the first fluid.

36. The method of claim 34, further comprising selecting the second fluid to have an electrical charge of approximately zero.

37. The method of claim 34, further comprising selecting the second fluid to include deionized water and tetramethyl ammonium hydroxide.

38. The method of claim 37 wherein selecting the second fluid includes selecting a volume of the tetramethyl ammonium hydroxide to be approximately 0.006% of a volume of the deionized water.

39. The method of claim 34, further comprising selecting the second fluid to have a pH in the range of approximately 10.6 to approximately 11.4.

40. The method of claim 34, further comprising selecting the second fluid to have a pH of approximately 11.0.

41. The method of claim 34, further comprising selecting the first fluid to include an abrasive slurry.

42. The method of claim 34 wherein supplying the second fluid includes passing the second fluid upwardly through the planarizing surface.

43. The method of claim 34 wherein supplying the second fluid includes directing the second fluid downwardly onto the planarizing surface.

44. The method of claim 34, further comprising:

conditioning the planarizing surface by removing material from the planarizing surface following planarizing the microelectronic substrate; and

buffing the microelectronic substrate on the same planarizing surface by engaging the microelectronic substrate with the planarizing surface and moving at least one of the planarizing surface and the microelectronic substrate relative to the other of the planarizing surface and the microelectronic substrate.

45. The method of claim 44 wherein reducing the relative velocity between the microelectronic substrate and the planarizing surface includes reducing the relative velocity between the microelectronic substrate and the planarizing surface to approximately zero over a period of time in the range of approximately ten seconds to approximately thirty seconds.

46. The method of claim 44 wherein reducing the relative velocity between the microelectronic substrate and the planarizing surface includes reducing the relative velocity between the microelectronic substrate and the planarizing surface to approximately zero over a period of approximately fifteen seconds.

47. A method for planarizing a microelectronic substrate with a planarizing machine having a planarizing surface, the method comprising:

positioning the microelectronic substrate adjacent to the planarizing surface to engage the microelectronic substrate with the planarizing surface and moving one of the planarizing surface and the microelectronic substrate relative to the other of the planarizing surface and the microelectronic substrate to remove material from the microelectronic substrate;

supplying a first fluid to the planarizing surface; and

reducing an attraction between the material removed from the microelectronic substrate and a surface of the microelectronic substrate by supplying a second fluid to the planarizing surface while reducing a relative velocity between the microelectronic substrate and the planarizing surface to approximately zero, the second fluid having a chemical composition different than a chemical composition of the first fluid and having a pH approximately the same as a pH of the first fluid.

48. The method of claim 47, further comprising selecting the second fluid to have an electrical charge approximately the same as an electrical charge of the first fluid.

49. The method of claim 47, further comprising selecting the second fluid to include deionized water and tetramethyl ammonium hydroxide.

50. The method of claim 47, further comprising selecting the first fluid to include an abrasive slurry.

51. A method for conditioning a polishing pad of a planarizing machine used for planarizing a microelectronic substrate, the method comprising:

selecting a conditioning liquid to have a pH approximately equal to a pH of a planarizing liquid that contacts the polishing pad during planarization of the microelectronic substrate, the conditioning liquid having a chemical composition that is different than a chemical composition of the planarizing liquid; and

conditioning the polishing pad by supplying the conditioning liquid to a planarizing surface of the polishing pad and removing polishing pad material from the polishing pad after planarizing the microelectronic substrate.

52. The method of claim 51 wherein supplying the conditioning liquid to the planarizing surface of the polishing pad includes passing the conditioning liquid upwardly through openings in the polishing pad.

53. The method of claim 51 wherein supplying the conditioning liquid to the planarizing surface of the polishing pad includes depositing the conditioning liquid downwardly onto an upward facing surface of the polishing pad.

54. The method of claim 51 wherein selecting the conditioning liquid includes selecting the conditioning liquid to include deionized water and tetramethyl ammonium hydroxide.

55. The method of claim 51 wherein selecting the conditioning liquid includes selecting a volume of the tetramethyl ammonium hydroxide to be approximately 0.006% of a volume of the deionized water.

56. The method of claim 51 wherein selecting the conditioning liquid includes selecting the conditioning liquid to have a pH in the range of approximately 10.6 to approximately 11.4.

57. The method of claim 51 wherein selecting the conditioning liquid includes selecting the conditioning liquid to have a pH of approximately 11.0.

58. The method of claim 51 wherein conditioning the polishing pad includes mechanically roughening a surface of the polishing pad while the conditioning liquid is disposed on the surface of the polishing pad.

59. The method of claim 51 wherein selecting the conditioning liquid includes selecting the conditioning liquid to have an electrical charge approximately equal to an electrical charge of the planarizing liquid.

60. The method of claim 59 wherein selecting the conditioning liquid includes selecting the conditioning liquid to have an electrical charge of approximately zero.

61. A method for processing a surface of a microelectronic substrate after planarizing the microelectronic substrate, the method comprising:

selecting a rinsing fluid to have a pH approximately equal to a pH of a planarizing fluid that contacts the microelectronic substrate during planarization of the microelectronic substrate, the rinsing fluid having a different chemical composition than a chemical composition of the planarizing fluid; and

supplying the rinsing fluid to the surface of the microelectronic substrate to remove particulates from a surface of the microelectronic substrate after planarizing the microelectronic substrate.

62. The method of claim 61 wherein planarizing the microelectronic substrate includes engaging the microelectronic substrate with a planarizing surface and supplying a rinsing fluid to a surface of the microelectronic substrate includes passing the rinsing fluid upwardly through openings in the planarizing surface adjacent the microelectronic substrate.

63. The method of claim 61 wherein planarizing the microelectronic substrate includes engaging the microelectronic substrate with an upward facing planarizing surface and supplying a rinsing fluid to a surface of the microelectronic substrate includes depositing the rinsing fluid downwardly onto the planarizing surface adjacent the microelectronic substrate.

64. The method of claim 61 wherein planarizing the microelectronic substrate includes engaging the microelectronic substrate with a polishing pad and supplying the rinsing fluid occurs while the microelectronic substrate remains engaged with the polishing pad.

65. The method of claim 61 wherein planarizing the microelectronic substrate includes engaging the microelectronic substrate with a polishing pad, further comprising moving the microelectronic substrate from the polishing pad to a rinsing location that is spaced apart from the polishing pad and rinsing the microelectronic substrate at the rinsing location with the rinsing fluid.

66. The method of claim 65 wherein rinsing the microelectronic substrate is conducted for approximately five seconds.

67. The method of claim 61 wherein selecting the rinsing fluid includes selecting the rinsing fluid to include deionized water and tetramethyl ammonium hydroxide.

68. The method of claim 61 wherein selecting the rinsing fluid includes selecting the rinsing fluid to include a volume of the tetramethyl ammonium hydroxide to be approximately 0.006% of a volume of the deionized water.

69. The method of claim 61 wherein selecting the rinsing fluid includes selecting the rinsing fluid to have a pH in the range of approximately 10.6 to approximately 11.4.

70. The method of claim 61 wherein selecting the rinsing fluid includes selecting the rinsing fluid to have a pH of approximately 11.0.

71. A method for processing a microelectronic substrate with a planarizing machine having a polishing pad, the method comprising:

planarizing the microelectronic substrate by moving at least one of the polishing pad and the microelectronic substrate relative to the other of the polishing pad and the microelectronic substrate to remove material from the microelectronic substrate;

conditioning a planarizing surface of the polishing pad by removing polishing pad material from the planarizing surface after removing material from the microelectronic substrate; and

cleaning the microelectronic substrate to remove particles adhered to the microelectronic substrate by engaging the microelectronic substrate with the same planarizing surface and moving at least one of the polishing pad and the microelectronic substrate relative to the other of the polishing pad and the microelectronic substrate after conditioning the polishing pad.

72. The method of claim 71 wherein conditioning the polishing pad includes roughening the planarizing surface of the polishing pad.

73. The method of claim 71 wherein cleaning the microelectronic substrate includes disposing a rinsing liquid on the planarizing surface of the polishing pad.

74. The method of claim 73 wherein planarizing the microelectronic substrate includes disposing a planarizing liquid on the planarizing surface of the polishing pad, the planarizing liquid having a pH, further comprising selecting a pH of the rinsing liquid to be approximately the same as the pH of the planarizing liquid.

75. The method of claim 71 wherein planarizing the microelectronic substrate includes supplying a planarizing liquid to the polishing pad and cleaning the microelectronic substrate includes supplying a rinsing liquid to the polishing pad while moving the at least one of the polishing pad and the microelectronic substrate relative to the other of the polishing pad and the microelectronic substrate, the rinsing liquid having a pH approximately the same as a pH of the planarizing liquid.

76. The method of claim 75 wherein supplying the rinsing liquid includes selecting the selecting the rinsing liquid to include deionized water and tetramethyl ammonium hydroxide.

77. The method of claim 76 wherein selecting the rinsing fluid includes selecting a volume of the tetramethyl ammonium hydroxide to be approximately 0.006% of a volume of the deionized water.